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ABSTRACT

The relatively new discipline of information science has its origins in the West, while the ancient martial arts have their origins in the East. Despite these differences in age and hemisphere, the two disciplines can be shown to possess many conceptual as well as technical similarities which have evolved quite independently of each other. This paper discusses some of the concepts and techniques inherent in the martial arts and shows how they are being applied in information science--particularly in the branch of online searching. Points of primary importance in the martial arts which are considered and related to searching include: aims and goals; type of character and skills required; form; balance and correct use of power; basic techniques; fighting strategies; common faults; and training. (Author/MAB)

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# INFORMATION SCIENCE AND THE MARTIAL ARTS: PERSPECTIVES ON ONLINE SEARCHING

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# INFORMATION SCIENCE AND THE MARTIAL ARTS: PERSPECTIVES ON ONLINE SEARCHING

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KEYWORDS: information science; martial arts; online information retrieval; online searching; search strategies; searcher skills; training

ABSTRACT: The relatively new discipline of information science has its origins in the West, while the ancient martial arts have their origins in the East. Despite these differences in age and hemisphere, the two disciplines can be shown to possess many conceptual as well as technical similarities which have evolved quite independently of each other. In the sections which follow, some of the concepts and techniques inherent in the martial arts will be discussed and it will be shown how they are being applied in information science--particularly in the branch of online searching. Points of primary importance in the martial arts which will be considered and related to searching include: aims and goals; type of character and skills required; form, balance and correct use of power; basic techniques; fighting strategies; common faults; and training.

## 1. INTRODUCTION

Information science is a relatively new discipline with its origins primarily in the Western world and the martials arts are centuries older and have their origins in the East. Despite the vast gulf in age, distance and scope that separates them, the two disciplines can be shown to possess many similar concepts, philosophies, ideas, techniques and strategies all of which have evolved quite separately from each other. The wa of the martial arts may well be much more familiar to participants at this conference than the way of information science, and so what I should like to do in the sections that follow is to take some of these concepts and techniques which are inherent in the martial arts and attempt to show how they are also being applied in online searching - a branch of information science. Aspects of the martial arts which will be considered, discussed and related to online searching include: aims and goals; type of character and skills required; form, balance and correct use of power; basic techniques; fighting strategies; common faults; and training.

## 2. AIMS AND GOALS

The ultimate aim of many of the martial arts is the attainment of complete harmony with and control of one's body and mind. Despite their warlike aspects, the various martial arts provide a total system of training and way of life which enables practitioners to radically transform themselves into strong, healthy, mentally well-

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balanced, self-disciplined individuals. because of this training, the martial artist is secure in his own self-knowledge, control, skills and ability and thus can strive for other goals like avoiding conflict situations or defending himself without harming his opponent - even though the prime objective might be to win.

In information science, more particularly online searching, the information scientist also aims to achieve harmony and control, though s/he may not realise it. In searching, the searcher attempts to obtain complete harmony between himself and the search system and database so that the correct results (ideally a perfect score) can be achieved. By controlling his actions the online searcher can also achieve a state of harmony between input and output, though as in the martial arts the output can far outweigh the input. To illustrate this, consider the input of one or two discrete words - but they have the power to transform the output into a series of relevant, information-filled records and this is the searcher's goal.

## 3.TYPE OF CHARACTER AND SKILLS REQUIRED

The dedicated martial artist hopefully and eventually grows into an all round, whole person with a deep sense of dignity, calmness and serenity and with an alert and disciplined mental and physical attitude. He is a person who has total awareness of what goes on around him and the ability to constantly analyze the situation in light of incoming data (eg position, movements and strikes of an opponent). The martial artist is someone with the inner strength and stamina to continue when the pace is hard and when the difficulties are enormous - someone who does not give up. A person with a noble spirit who constantly strives to improve himself still more and for whom the process of learning is never complete. The true martial artist is someone with a controlled, balanced personality who is aware of his own strengths and weaknesses and able to focus his mind and concentration for total absorption and involvement in the task at hand. Desirable qualities include speed, endurance, agility, good coordination, a creative and intuitive flair, courage, self-discipline and the ability to think and act swiftly. A good physique is also useful, though not essential.

The online searcher must be similarly dedicated, disciplined and have a positive attitude. He must also have a good general knowledge, possess an inquiring mind and show a willingness to learn. Qualities and skills needed by searchers to be able to develop the necessary facilities include some subject knowledge and scientific and technical background if they are to search well, understand the problem and what the user wants and formulate the request into a suitable form for the online system. For this it is important that the searcher be able to listen and explain what he is doing and why.

Armed with basic knowledge and techniques, information scientists and others can do searches - but this is really only half the story. To be able to search effectively the online searcher needs

flexibility of thinking, imagination and persistence. He needs to have the ability to be able to see and grasp the essential aspects and reject those that are redundant and unnecessary - just as the martial artist must be able to see a feint for what it is and dismiss it. Online searchers require the ability to break down problems into relevant concepts and analyse them and they need to be able to think and act logically, clearly, quickly and decisively. Furthermore, they need to have some critical powers to be able to evaluate intermediate search results and hence modify a search strategy. Like martial artists, too, they have to be able to concentrate on the problem facing them and not let their attention wander lest they lose the thread of their thoughts. However, because a sense of timing is far less critical in searching than in fighting, the information scientist can permit his mind to roam more freely in the hope that it may alight spontaneously on some other search term. Typing ability is useful!

4. FORM, BALANCE AND CORRECT USE OF POWER

Martial arts, like most sports, depend on correct form for effective techniques. All parts of the body must act in coordination to provide the necessary stability for striking and blocking. For correct form, balance and stability are important - since without them one cannot execute proper techniques. Strong, effective techniques emanate from a firm stance - a good, rooted stance or grounding gives the ability to attack and defend and change position without being at a disadvantage. Since power is drawn from the earth, firm contact with the ground gives the martial artist the necessary strength, stability and spirituality. The body's centre of gravity is essential to good balance, but it is always shifting. The lower the centre of gravity, the better the stability, but there can be a loss of flexibility. Therefore, there has to be a compromise and the different stances in the martial arts reflect this by varying the situation and the fighting strategy adopted.

Strong and effective techniques, however, do not only come from good balance and a stable stance, they come also from using the correct muscles fully and harmoniously. To achieve maximum power, the martial artist has got to use the strength from all the necessary parts of the body simultaneously or, at least, in one continuous flowing movement. He should not use unnecessary muscles or muscles that hinder the performance of a technique. The power generated in the build up to a strike or block has to be focused in the foot or hand or weapon that is being used to effect the technique.

To be an effective information scientist and online searcher a good grounding or foundation is also needed - in search techniques, database structures and content, the philosophy behind indexing etc. What is also needed is a good in-depth search technique whereby the searcher explores systematically all the various options. This shows good form - and when all the different search elements have been evaluated and weighed in the mind, then they

must be used in such a way that the search statements are balanced (ie that not only do parentheses match, but that the search is not biased in favour of one term and all concepts are represented). Just as the martial artist must focus his blows so the online searcher must focus his search on the right topic. Focusing can be done by using specific keywords rather than than broad ones to narrow down the field and reduce noise until just the right references are found. Like the martial artist the online searcher must be able to view the situation from a variety of different angles, positions and take the appropriate stance. The searcher should also learn to be economical in his use of search expressions and, like the martial artist and his muscles, know which databases, data elements and keywords to use when. He should know how they can be used, what each does and will do, how to choose them and when they should be applied correctly.

## 5. BASIC TECHNIQUES

The martial artist must learn, and constantly and diligently practice, many basic techniques which have evolved over many years of constant practice, honing and refinement. He must learn, for example, the different types of kicks and punches; strikes and blocks; grips; locks and chokes; throws and hold - downs; evasions; and cuts, thrusts and parries of weapons. He must also learn how to form and correctly execute them; when and where they should be applied; and the ideas or meaning behind them. In addition, he must learn how to move smoothly and economically, forward and back, sideways, diagonally, up and down; how to change direction; how to move while changing his stance and body position and how to move without changing them.

Inherent in such movements are rhythm and timing. Rhythm is a vital element since without it the proper, focused execution of a series of movements is not possible. Correct timing is also essential whether the martial artist is attacking or defending. hands and feet as well as body have got to be in the most suitable position so that not only can techniques be easily and quickly applied, but an effective position can be returned to immediately following execution of a move. Implicit here is a good reaction time.

The martial artist must also learn to recognize his own limits in terms of range, endurance and stances for striking and blocking. Someone taking up martial arts later in life may be less flexible, slower and tire more easily than someone much younger. Furthermore the martial arts involve intense concentration and the ability to focus one's attention intently on one target and direction and then turn it away entirely to face another target and direction.

To understand the martial arts (or indeed to become a good online searcher) you have got to understand its techniques. Techniques is the accumulation of knowledge about forms, joints, angles, positions, power etc. To understand correct form you have got to understand your body and how the parts interact to provide a single, solid, power-producing unit for penetrating the target by

punching, striking, kicking or however. The position of the hands, feet and legs in relation to the body determines whether they can reach and penetrate the target and their correct alignment with the body gives balance and coordination. The martial artist must also learn to read his opponent's body - the strong points and weak points, the joints and pressure points, and what body angles and techniques are possible or will be best for striking or throwing.

Similarly, the information scientist must have a knowledge of the information and scientific communication process (ie how information is generated, disseminated or transferred, and gets into databases). In addition, he must know a great deal about the basic techniques involved in searching. To this end he must have a good knowledge and understanding of information and retrieval systems, their features, command languages, options and short-cuts; and following on from that a good knowledge and understanding of databases, their record structures, coverage, content, access points, limitations, and so on. This includes knowing about the structure of abstract journals and their indexes and their relationship to online databases as well as how they are all created. Coupled with these is, of course, an understanding of the basic principles of searching such as use of vocabulary and search terms, truncation, logic, file inversion etc. He must be aware of the advantages and disadvantages of online searching and the terminology used. Besides the above, basic techniques involve knowledge about the search software; the indexing process; modes of access; instructional aids; equipment; trade-offs; and the different ways of looking for information.

Other basic techniques which the online searcher must know and employ include methods for improving recall (such as using synonyms, broader terms, or truncation; or by clustering or omitting concepts) and methods for improving precision (such as using more specific terms; adding concepts; use of links, roles and weights). In addition, for effective searching, he must have a knowledge of the stopwords used; what the sort order is; what the parsing rules are; what the execution order of parentheses is; and which fields in the records are searched by default and so on. The information scientist/online searcher has got to understand how databases are designed and set up, how they relate to abstract journals, what their constituent parts are and how each field relates to the whole; how individual records are constructed, what parts are searchable and which are not, which are useful access points and which are not; and which terms or abbreviations are more useful in which situations.

In approaching a database, the online searcher could consider it to be an enemy or opponent and thus he has to discover how best to penetrate it, what its weak points are, and how it can be manipulated to give the best results or a favourable outcome. This involves understanding the search language and how the commands interlink with keywords and search terms to produce and effective search strategy. To be effective you have to master the details of proper combinations and language syntax. For example, it is more

effective to select INFORMATION (W) RETRIEVAL rather than RETRIEVAL (W) INFORMATION (just as a middle level block followed by an elbow strike is more effective than doing the strike first followed by the block). neither technique is necessarily wrong, but one produces better results.

## 6. FIGHTING STRATEGIES

Strategy is often overlooked. Martial artists might know many varied techniques and how to execute them correctly and they might have built up their endurance by training and conditioning, but the application of a good fighting strategy is often neglected. Although the overall objective (to defeat an opponent or at least not to lose) can remain the same, the strategy can vary depending on the opponent, the environment, terrain and the conditions. Whether you seize the initiative earlier in a surprise attack or later when you have seen how things develop and waited until your opponent commits himself, a strong lead-off techniques is necessary to neutralize, weaken and control the opponent's position thus enabling you to create time, distance and space. Time is needed to attack, to defend or simply to react. Distance is needed to create defensive space (for retreating) as well as offensive space (for attacking). Another positional advantage is that of stance - the arrangement of limbs and body for maximum protection and speedy ability to react. Physique, which has a bearing on strength, size, speed, power, coordination, endurance and ability, also plays an important part in deciding strategy.

Attacks need to be planned scientifically, for in many of the martial arts (unlike street fighting) you are normally attacking and defending against a specific, predictable movement pattern - a technique - rather than a target. Thus you should seek to gain advantages and neutralize positions by distractions to catch the opponent off-guard (for example, by a foot sweep, a feint or double movement) or by forcing the opponent to abandon his preferred method of fighting. The attack needs also to be continually reappraised and adjusted. Thus there should be not only direct, frontal, linear attacks, but also angled, circular attacks and side-stepping, deflections, withdrawals so that not only can the opponent be outmanoeuvred, but a more advantageous position for countering can be found.

One thing that stands out about the martial arts is that there is almost an infinite variety of rich techniques and combinations possible. And these combinations are vital for following-up an attack. The martial artist cannot just rely on one punch or kick to stop an opponent, instead he must have ready and be able to employ a whole combination of strikes and kicks to finish the encounter once and for all.

To search effectively the information scientist must also consider strategy. As with martial arts, over the years experience has led to the development of a variety of strategies, each of which can be used under given circumstances. Probably the most basic strategy

is first to choose one or more search terms for each concept; then logically combine these with Boolean AND, OR, NOT; then look at the results (output) from the combinations to establish relevance and obtain new search terms; and then finally modify the search in light of the new data. This basic process continues until the searcher is satisfied he has sufficient, relevant information.

A number of other strategies emanate from this one: there is the quick 'n dirty search whereby just a single, truncated terms is entered for each concept and combined - the large output can be then reduced to more specific topics if necessary; there is the exhaustive search where as many terms as possible are entered for each concept (this is often a waste of time as some terms will be unproductive); there is the strategy of entering a known reference and then seeing how it has been indexed and using these terms to find other citations; and there are others. They all have the same effect - namely to achieve a good result - and they all work in similar ways, either as building blocks (adding more and more terms until the desired result is reached) or as demolition squads (where a big, broad search is successively reduced to a reasonable result).

There are other factors also which have to be taken into account in the overall strategy of retrieving information relating to a given topic. There is the geographic location of the host and the distance you are from it. Distance hosts mean either a more costly search or else, to keep down online telecommunications costs, then a more simple, broader, less-focused search. There are time constraints too - a searcher is always conscious of the time unless money is no object. Preparing the search offline first often means spending less time online. Decisions have to be made on what terms are likely to produce useful information from which databases within the constraints of time and costs.

And, or course, just as the martial artist has to be aware of the different combinations of blows and blocks, so the information scientist has to realize that there are different ways to use and combine the search terms. The objective (the retrieval of relevant information) has to be approached from a number of different angles before the correct breakthrough can be achieved. Not all strategies will be suitable for every type of search - some searches can be done in a very direct manner and can be finished almost immediately (like a swift, frontal attack); while others have to be approached in a roundabout way and involve many iterations and constant entering and combining of new terms before the information can be prized out. The online searcher, every bit as much as the martial artist, has to continually adjust his strategy in light of the incoming data or intermediate results.

Concentration is vital in the martial arts no less than in the science of online searching. If you cannot concentrate in the martial arts then you will be the loser. The same applies to searching - only with concentration will the searcher get the flash of insight which enables him to get to the heart of the database

and retrieve the desired information. Thus, a major part of strategy is being prepared. The martial artist might be unarmed, but he is able to use whatever is available and does not thus feel at a disadvantage by the lack of fancy weapons. Similarly, a searcher equipped with a good knowledge of basic techniques and experience in strategy should not feel unable to cope without having a thesaurus or user manual to hand.

## 7. COMMON FAULTS AND PROBLEMS

No matter what one does, whether it is a sport, a trade, a hobby, in the initial learning phase there will always be some faults in the execution of it which have to be corrected. For some disciplines the learning process is longer rather than shorter and may, in fact, never be considered complete. The martial arts is one such discipline where even masters consider themselves still be beginners. Common faults with newcomers to, say, karate, include the upper body learning forward or back too much; the hips not being always at the same level; insufficient hip rotation with the shoulder turning first; poor stance with supporting leg and heel not firm and grounded; being too tense and not keeping the shoulders relaxed; lack of kime or focus; not withdrawing the arm or leg sufficiently; keeping the head down and the eyes fixed on the ground (in kata) or at the opponent's hand, foot or weapon rather than being generally aware; bad timing, distance and speed; selecting and using an ineffective block or strike for a given situation; and generally poor form.

In online searching, there are also some common faults which the beginner makes. One of these is to believe that he can carry out an effective, cost-efficient search as soon as he knows a few basic techniques or commands. All too often he searches far too specifically. Another common fault is not to define the question precisely enough and hence search too broadly. It also seems difficult for users to transfer an information problem into an adequate search strategy. Allied with this is the mistake of not thinking of and using alternative terms or concepts, variations in spelling, abbreviations, different language terms etc. Just as important is knowing which search terms not to use and when a concept can be safely dropped from a search. Poor searches can also be done by not understanding the requirements properly and hence doing the search on what the searcher thinks the user wants (or should have) rather than what he actually does. Another frequent fault is not knowing when to stop searching - there is no need to retrieve every single reference to a subject when just a few good ones will suffice.

Other common problems relate to confusion with Boolean operators and parentheses and understanding how they work and when to use them and why they are required. Novice searchers also have difficulties with the command languages as well as database selection and evaluation. What they seem to lack, at the early stage, is an ability to relate to the search process, handle question negotiation and represent the problem in the language of

the search system.

8. TRAINING

Many of these faults and problems can, of course, be traced to poor instruction, inadequate training or poor preparation, and ignorance or a lack of understanding of the reasons behind the techniques and movements and how and why they should be applied. This state of affairs can be due to the instructor, the student or both and the problems can be overcome with good training which leads to the necessary experience and knowledge. With regular, constant training the effects of practising are cumulative.

Training, in the martial arts, includes time set aside for meditation to clear the mind first; warm-up exercises to stretch the muscles and so reduce the likelihood of injuries; power conditioning; and training in the basic and advanced techniques, sparring and kata. Training can be carried out to develop certain parts of the body, eg the arms or the legs - but the strength built up by such training is often purely localized and not integrated into the rest of the body. Training must ideally envelop the whole body including the mind so that internal energy as well as physical strength can be directed to wherever it is needed. There are both internal and external aspects to the martial arts. External aspects include the positioning and movement of the body and limbs; correct technique and form; and muscular strength, speed and balance etc. Internal aspects include correct breathing; poise and body tone; attitude of mind and awareness; and internal energy (ki). Good training will aim to develop these aspects and foster an appreciation of them.

The martial arts are, when taught properly, a complete education and training system in themselves and provide and demand total involvement and awareness, mental challenge and self-development such that your character is filled out. They are broad enough and deep enough to enable you to handle any potential conflict situation. Indeed, martial arts principles have been extended to non-warlike areas such as business administration! They can also help to alleviate stress by forcing the practitioner to empty his mind and concentrate on the kata or techniques being done. There can be no place for a wandering mind in the martial arts - although a mind that wanders freely over an idea or concept can be more creative.

Good training is also essential for the information scientist in his role of searcher. Training in the use of the equipment - terminal, modem, micro; training in the host access procedures; in the search languages and commands; in the databases; training in how to actually search and translate problems into search terms; training in how to think round the concept (lateral thinking); general training in file and record structures and so on. Like the martial artist, the information scientist searcher must also continually train himself so that he can remain up-to-date with the new databases and new commands and features which become available

to enable him to take full advantage of them to make his searches more efficient and cost-effective.

Training is needed to help overcome the faults and problems mentioned earlier. The practitioner, whether he be an end-user searcher or a martial artist, has to be taught what to do, for instance, when the search results are poor or when the punch or kick is ineffective. He has to revise his strategy and follow up with other combinations of keywords or strikes/kicks/blocks instead of just giving up and thinking that no information or outcome exists. Training leads to experience, experience leads to knowledge, and with knowledge all things are possible.

## 9. CONCLUSION

An online search is affected by the environment and surroundings (in a noisy atmosphere you may not be able to concentrate); by the searcher and user characteristics (the user may not be able to read Chinese articles, the searcher may not have the right technical background to understand the question); by the characteristics of the search problem; and by the characteristics of the databases and the search system. The martial arts are similarly affected bay the environment; the characteristics of the practitioner and his opponent; and the characteristics of the style and system chosen.

In online searching there are many command languages and no single one is best suited to all information retrieval functions and situations. So it is in the martial arts - many different systems have evolved at different times in different places taking into account local needs and conditions (both social and physical). But there has been a synthesis of some styles (creating yet another style) where systems and styles have been combined to make a more general purpose system. This is like the common command languages of online information retrieval where one language hopes to be all things for all people to save them learning many different search languages.

There is also even the aspect of copyright. Not only is this a big issue in librarianship and information science, but it has been recently brought into the martial arts by some practitioners who believe they can copyright their style. Copyright protection does not last forever and does not extend to ideas. The majority of martial arts are ancient and in the public domain and are therefore not copyrightable. On the other hand a new style (even if created by an amalgamation of older styles) or kata written up in a book could by copyrighted. It is the book that is, in fact, made copyright no the style or idea itself.

This paper has presented some of the features of two separate disciplines - the martial arts and information science - and has tried to show that, despite their dissimilarity on the surface, there are, nevertheless, some very real similarities in terms of the concepts and philosophies and styles and strategies that each employs as well as in their planning, execution, analysis and

evaluation and even in the way they are developing today. A martial artist never stops learning - and neither does an information scientist online searcher.